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## PATENT SPECIFICATION



Convention Date (Sweden): Aug. 16, 1923.

220,594

Application Date (In United Kingdom): March 24, 1924. No. 7453/24.

Complete not Accepted.

### COMPLETE SPECIFICATION.

#### Improvements in Internal Combustion Engines, Compressors, Pumps and the like having Axial Pistons and Wabbling Driving Discs.

I, ARVID LIND, of Fridhemsgatan 21, Stockholm, Sweden, Mechanical Engineer, of Swedish nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to internal combustion engines, compressors, pumps and the like having axial pistons disposed around a central shaft and a wabbling driving disc engaging the pistons. The object of the invention is to provide such connection between the driving disc and the pistons that the latter are wholly or to an essential degree relieved from radial pressures whereby the friction and wear of the pistons against the walls of the cylinders are essentially reduced.

The invention consists, chiefly, in this that the connection between the driving disc and the pistons is obtained by means of sliding members which are movable in relation to the pistons in a plane perpendicular to the axes of the pistons and which for this reason can transmit pressure to and from the pistons only in a direction parallel to the axes of the pistons.

The invention is illustrated in the accompanying drawing, which shows an axial longitudinal section of an internal combustion engine with an arrangement according to this invention

Referring to the drawing, 1 is a stationary cylinder drum which can contain any desired number of cylinders,

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for instance four cylinders, axially disposed around a centrally journaled 40 rotatable shaft 2. The cylinders contain pistons 3 which on one side have the working chambers 4 of the cylinders and on the other side pumping chambers 5 wherein the load is formed in the manner 45 usual in two stroke cycle engines. A hub 6 is secured to the shaft in an oblique position, on which hub the driving shaft 7 is journaled by means of thrust bearings, preferably ball bearings 8. The 50 driving shaft is prevented from rotating by means of guiding pins not shown which engage corresponding guiding surfaces in the cylinder drum 1 in well-known manner. The 55 driving disc 7 is provided with projections or arms 9 having spherical or cylindrical pins 10. The pins 10 are surrounded by sliding members 11, 11 which on the sides engaging the pins have cup-shaped or channel-shaped recesses corresponding to the form of the pins for 60 securing the necessary engaging surfaces between the pins and the sliding members. The opposite sides of the sliding 65 members are plane and engage corresponding plane surfaces 12, 12 on the pistons, said surfaces being disposed at right angles to the axes of the pistons. 70 The pressures which are transmitted to and from the pistons by the sliding members 11, 11 act accordingly always in the longitudinal direction of the pistons the latter being thus relieved from radially acting components of pressure. The 75 obliquely acting pressures which arise

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when the a.m 9 engaging a piston has an oblique position in relation to the motor shaft are wholly taken up by the ball bearings of the driving disc.

- 5 It is not necessary in order to relieve the pistons from radial pressures that the sliding surfaces between the pistons and the sliding members 11, 11 be plane. The same effect may also be attained by means of cylindrical or other prismatic surfaces which effect guiding in a direction at right angles to the axes of the pistons. If such prismatic surfaces are used it is generally necessary to provide 15 for movability in peripheral direction to a certain extent between the pins 10 and the sliding members to prevent clogging during the wobbling motion of the driving disc. Such movability is in the simplest way obtained by using cylindrical engaging surfaces on the pins 10 20 and the sliding members 11, 11.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In internal combustion engines, compressors, pumps and the like having 30 cylinders which are axially disposed around a central shaft and pistons in said cylinders engaging a wobbling driving disc journaled on the shaft, an arrangement characterised by this that

the connection between the driving disc 35 and the pistons is obtained by means of sliding members adapted to move relatively to said pistons in a plane which is perpendicular to the axes of the pistons.

2. An arrangement as claimed in Claim 1, characterised by this that the surfaces of the pistons and the sliding members engaging each other are plane and perpendicular to the axes of the 45 pistons while the engagement between the sliding members and the driving disc is obtained by means of spherical or cylindrical pins secured to the latter in well-known manner. 50

3. An arrangement as claimed in Claim 1, characterised by this that the surfaces of the pistons and the sliding members engaging each other form 55 cylindrical or prismatic guides which guide the sliding members in a direction perpendicular to the axis of the corresponding piston, while the engagement between the sliding members and the driving disc is obtained by means of 60 spherical or cylindrical pins secured to the latter in well-known manner.

Dated this 24th day of March, 1924.

GRUIKSHANK & FAIRWEATHER.

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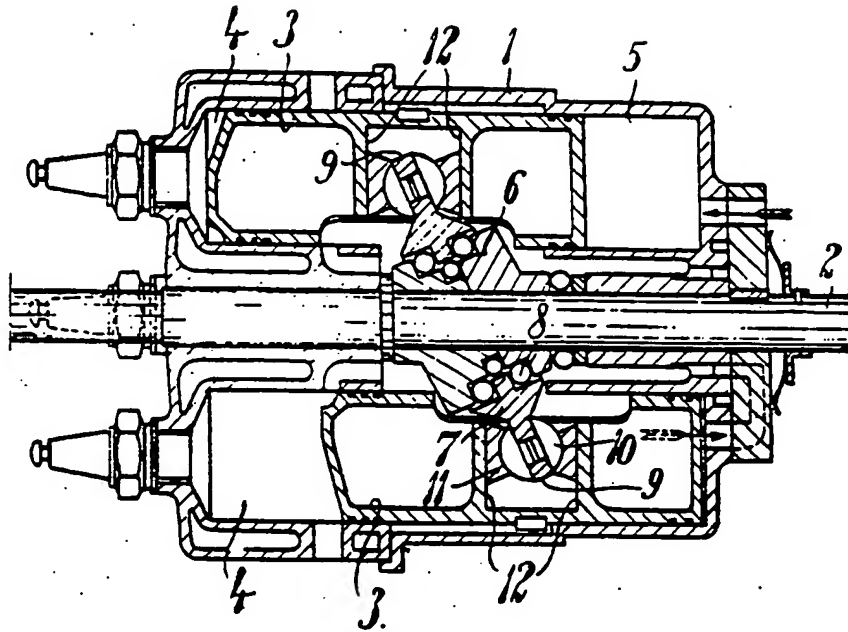
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*[This Drawing is a full-size reproduction of the Original.]*



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